

FACILITIES MAINTENANCE AND ENGINEERING PROCEDURE		
Subject: ENGINEERING DRAWINGS	FMEP-P-0300	Rev. No. 2
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1.0 PURPOSE

- (a) To define the requirements for the preparation, review, approval and control of drawings prepared by the Facilities Maintenance and Engineering (FME) organization.
- (b) To define the requirements for the review of drawings prepared by a contracted Architect Engineer (A&E).

2.0 GENERAL

2.1 Control of Drawings Using Document Logs

Drawings received by FME for review and drawings issued by FME for use are to be controlled in accordance with Section 3.4 of the FME procedure, FMEP-A-0010, Processing of Design and Miscellaneous Documents.

2.2 Definition

A drawing that defines the description, scope, location, arrangement, and details of material, equipment, parts, processes, components, systems, and structures.

2.3 Type of Drawings

The drawing categories addressed by this procedure are preliminary design drawings and design drawings. These drawing categories are described below:

(a) Preliminary Design Drawings

Design drawings not ready to be issued for construction or procurement may be issued as preliminary design drawings for purposes such as:

- Internal coordination
- Client Review

Preliminary design drawings shall be identified with alpha revision designators (i.e., A, B, C, etc.)

(b) Design Drawings

Design drawings are drawings that are issued for purposes such as:

- Procurement
- Construction
- Fabrication
- Supplier or Subcontractor bid

Design drawings shall be identified with numeric revision designators (i.e., 0, 1, 2, etc.)

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2.4 Signature and Date Requirements

- (a) All signature and dates are to be made using black ink or a grade of lead pencil that allows the signature and date to be reproducible.
- (b) “Initials” may be used in lieu of “signature” requirements in this procedure.

2.5 SAIC Review Signature

The SAIC review signature on drawings created by a contracted Architect Engineer DOES NOT CONSTITUTE ACCEPTANCE OR APPROVAL OF DESIGN DETAILS OR MATERIAL SELECTION IDENTIFIED ON THE DOCUMENT AND DOES NOT RELIEVE THE CREATOR OF THE DOCUMENT FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATIONS.

2.6 A&E Drawing Review

Refer to the FME procedure FMEP-P-0340, Review of Architect Engineering Documents, for drawing review considerations.

3.0 PROCEDURE

3.1 Drawing Numbering

Both FME and an A&E design drawing shall be numbered in accordance with the Facilities Maintenance and Engineering procedure FMEP-P-0240, “Document Numbering”.

3.2 Multisheet Drawings

Each sheet of a multi-sheet design drawing shall meet the signature requirements of this procedure. However, if the drawing has a cover page that identifies all the attached sheets and the revision level of each sheet, only the cover page needs to meet the signature requirement of this procedure.

Note: All sheets of a multi-sheet design drawing have the same drawing number.

3.3 Drawing Holds

When details of a pending drawing change have not been finalized, but issue of the drawing is required for other purposes, the area of the drawing not finalized shall be clearly identified as “HOLD”.

3.4 Checking

All FME created drawings shall receive an independent check by an individual who has adequate qualifications to have originated the drawing. Preliminary design drawings, which are to be reviewed internally by FME (not issued external by FME), may be excluded from the checking process. The Manager of Engineering is responsible for the assignment of checkers.

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A complete set of drawings to be checked with the supporting data necessary to check the drawings shall be provided to the checker. Each drawing shall be marked "CHECKPRINT". While in the process of being checked, no changes shall be made on the drawing without coordination with the checker. The checker shall follow the checking practices described in Exhibit A.

Drawings shall also be checked for:

Correctness, completeness, and freedom from interference
Conformance to design criteria
Compliance with applicable codes
Constructibility, operability, and maintainability, as applicable
Incorporation of all outstanding approved changes (see FMEP-P-0320)

The checker, when satisfied that the drawings are correct, shall sign in the appropriate title block location. After drawing review and signoff by the Project Manager, the check prints may be discarded.

3.5 Coordination

The Project Manager shall determine the necessity for the review of the design drawings. Individuals reviewing the design drawings are responsible for evaluating and reviewing the items pertinent to his/her area of technical responsibility, initialing, and returning the comments to the originating engineer. Exhibit F is to be used to implement and track the completion of this process.

3.6 Signature Requirements

The signature requirements for FME/A&E produced preliminary design drawing and design drawings are identified in Exhibits B, C, D, & E.

3.7 Signature Responsibilities

The responsibilities of those signing for the FME created design drawings are identified below:

<u>Title</u>	<u>Responsibility</u>
Drafter	Signoff indicates drawing is complete, satisfying drafting requirements, and complies with requirements provided by the responsible engineer.
Design Originator	Signoff indicates the drawing reflects the intended design and the applicable design criteria.
Design Checker	Signoff indicates the drawing is complete, meets the applicable design criteria, and is in compliance with this procedure.
Approver	See Manager of Engineering below.

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Verification Quality Assurance	Signoff indicates that the drawing reflects the intended scope of work.
Architectural Engineer	Signature indicates the drawing reflects the intended design and the applicable design criteria for their area of responsibility.
Civil Engineer	Signature indicates the drawing reflects the intended design and the applicable design criteria for their area of responsibility.
Mechanical Engineer	Signature indicates the drawing reflects the intended design and the applicable design criteria for their area of responsibility.
Electrical Engineer	Signature indicates the drawing reflects the intended design and the applicable design criteria for their area of responsibility.
Instrumentation Engineer	Signature indicates the drawing reflects the intended design and the applicable design criteria for their area of responsibility.
Drafting	Signoff indicates the drawing satisfies the drafting requirements.
Project Manager	Signoff indicates: (a) Drawing coordination has taken place and comments have been resolved. (b) Compliance with contract requirements
Contracting Officers Technical Representative	Signoff indicates constructiveness review of the drawing.
Safety	Signoff indicates the drawing has considered all safety requirements.
Requestor	Signoff indicates the drawing reflects the intended scope of work.
Manager of Engineering	Signoff indicates: (a) All signoffs have been completed (b) Conformance to procedural requirements (c) Release of drawing
FME Shops	
Carpenter	Initials indicate that the drawing reflects the intended design.

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Pipe	Initials indicate that the drawing reflects the intended design.
Refrigeration	Initials indicate that the drawing reflects the intended design.
Electric	Initials indicate that the drawing reflects the intended design.
Sheet Metal	Initials indicate that the drawing reflects the intended design.
Instrument	Initials indicate that the drawing reflects the intended design.
Sheet Metal	Initials indicate that the drawing reflects the intended design.
Millwright	Initials indicate that the drawing reflects the intended design.
Telephone	Initials indicate drawing coordination.

The responsibilities of the SAIC personnel signing for the A&E created design drawings are identified below:

<u>Title</u>	<u>Responsibility</u>
Verification Quality Assurance	Signoff indicates that the drawing reflects the intended scope of work.
Architectural Engineer	Signature indicates that the drawing has been reviewed in accordance with the requirements of procedure number FMEP-P-0340, Review of Architect Engineering Documents, for their area of responsibility.
Civil Engineer	Signature indicates that the drawing has been reviewed in accordance with the requirements of procedure number FMEP-P-0340, Review of Architect Engineering Documents, for their area of responsibility.
Mechanical Engineer	Signature indicates that the drawing has been reviewed in accordance with the requirements of procedure number FMEP-P-0340, Review of Architect Engineering Documents, for their area of responsibility.
Electrical Engineer	Signature indicates that the drawing has been reviewed in accordance with the requirements of procedure number FMEP-P-0340, Review of Architect Engineering Documents, for their area of responsibility.
Instrumentation Engineer	Signature indicates that the drawing has been reviewed in accordance with the requirements of procedure number FMEP-P-0340, Review of Architect Engineering Documents, for their area of responsibility.
Drafting	Signoff indicates the drawing satisfies the drafting requirements.

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Project Manager

Signoff indicates:

- (a) Drawing coordination has taken place and comments have been resolved.
- (b) Compliance with contract requirements

Contracting Officers
Technical Representative

Signoff indicates constructiveness review of the drawing.

Safety

Signoff indicates the drawing has considered all safety requirements.

Requestor

Signoff indicates the drawing reflects the intended scope of work.

Manager of Engineering

Signoff indicates:

- (a) All signoffs have been completed
- (b) Conformance to procedural requirements
- (c) Release of drawing

4.0 CONTROL

4.1 Revision Identification

Every issue of the drawing is to have a revision identification placed in the “*REVISION*” block on the drawing. The revision identification can be either an alphabetic or a numeric designator. See Exhibits B, C, D, and E.

4.2 Date

Every issue of the drawing is to have the date of origination placed in the “*DATE*” block on the drawing. See Exhibits B, C, D, and E.

4.3 Revision Description

Every issue of the drawing is to have a reason for issuance placed in the “*REVISION DESCRIPTION*” block on the drawing. Some typical reasons for drawing issuance are identified below.

- Issued for review
- Revised to Incorporate Review Comments
- Revised to Incorporate Client Comments and Issued for 65% Review.
- Issued As Built for WO XXXX-Incorporates _____.
- Issued for Construction.

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Note: The “*REVISION DESCRIPTION*” shall clearly state the reason for drawing issuance.

4.4 Drawing Revisions

Revisions to drawings shall be checked, reviewed, and approved in the same manner as the originals. For the issuance of revision 0 drawings, reference to prior alphabetic revisions shall be removed from the drawing and from the “*REVISION DESCRIPTION*” block. Revised areas on drawings shall be clearly identified. Circle the changes made to the drawing in the revision being issued. Revision indications from previous drawing revisions should be removed.

4.5 Voided/Superseded Drawings

Voided or superseded drawings shall be “Issued to Void or Supersede”, as applicable, with the next revision designator and shall be clearly marked VOIDED or SUPERSEDED BY DWG. _____ on the face of the drawing. Voided or superseded drawing numbers shall not be re-used.

5.0 DESIGN CHANGE NOTICE

A design change notice can be issued against a drawing in lieu of revising and reissuing the drawing. Refer to FME procedure number FMEP-P-0320.

FMEP-P-0300 Exhibits

- Exhibit A-Drawing Checking Practice (1page)
- Exhibit B-Requirements for Preliminary Drawings Submitted by an A&E (1 page)
- Exhibit C-Requirements for Final Drawings Submitted by an A&E (1page)
- Exhibit D-Requirements for Preliminary Drawings Created by FME (2 pages)
- Exhibit E-Requirements for Final Drawings Created by FME (2 pages)
- Exhibit F-Comment Memo and Comment Form (2 pages)